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CLAIMS:

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1. A detonator comprising:
 - (i) a hollow detonator shell having an open end and a closed end;
 - (ii) an igniting device at the open end of said shell;
 - (iii) optionally a delay element adjacent said igniting device;
 - (iv) an initiating element comprising an initiation portion and optionally a transition portion; and
 - (v) optionally a base charge.

characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

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2. A detonator as claimed in Claim 1 wherein said porous powdered explosive comprises PETN, RDX, HMX, Tetryl, TNT or a mixture thereof.

3. A detonator as claimed in Claim 2 wherein said porous powdered explosive comprises PETN.

4. A detonator as claimed in Claim 3 wherein said PETN has a number average particle size of greater than 100 microns.

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5. A detonator as claimed in Claim 1 wherein said high burn-rate pressurising initiator is selected from the group consisting of potassium picrate, potassium styphnate, lead styphnate, potassium trinitrobenzoate, alkali or alkaline earth metal salts of nitro-aromatic compounds, and mixtures thereof.

6. A detonator as claimed in Claim 5 wherein said high burn-rate pressurising initiator is potassium picrate.

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7. A detonator as claimed in Claim 1 wherein said high burn-rate pressurising initiator comprises a mixture of two separate components, namely a material having a high burn rate at low pressure and an oxidizer.

8. A detonator as claimed in Claim 7 wherein said oxidizer comprises potassium perchlorate or ammonium perchlorate.

9. A detonator as claimed in Claim 8 wherein said oxidizer comprises potassium perchlorate.

10. A detonator as claimed in Claim 1 wherein said initiation portion comprises between 5 and 15% by weight of said oxidizer and between 5 and 15% by weight of a material having a high burn rate at low pressure, which together form said pressurising initiator, and 70 to 90% by weight of said porous powdered explosive.

11. A detonator as claimed in Claim 1 wherein said transition portion comprises PETN, RDX, HMX, Tetryl or a mixture thereof.

12. A detonator as claimed in Claim 11 wherein said transition portion comprises PETN.

13. A detonator as claimed in Claim 12 wherein said PETN is pressed to a density of between 1.0 and 1.2 g/cc.

14. A detonator as claimed in Claim 1 wherein said confinement sleeve is a steel, copper or stainless steel sleeve.

15. A detonator as claimed in Claim 14 wherein said confinement sleeve is a circular sleeve having a wall thickness of between 0.1 and 1.5mm.

16. A detonator as claimed in Claim 1 wherein said initiation portion comprises a mixture of 5 to 15% by weight potassium picrate having a number average particle size of less than 10 microns, 5 to 15% by weight potassium perchlorate having a particle size of less than 10 microns, and 70 to 90% by

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weight PETN having a particle size of greater than 100 microns, and wherein said initiation portion has been pressed into a confinement sleeve so as to have a density of between 1.2 and 1.5 g/cc.

17. A detonator as claimed in Claim 16 wherein said transition portion
5 comprises PETN having a particle size of greater than 100 microns and has been pressed into a confinement sleeve so as to have a density of between 1.0 and 1.2 g/cc.

18. A detonator as claimed in Claim 1 wherein said initiation portion
10 comprises additional components selected from the group consisting of explosives, propellants, gas-generating compounds, organic fuels, binders and combinations thereof.

19. A detonator as claimed in Claim 1 wherein said igniting device
15 comprises a flame and/or shock wave from an electric match, a bridge wire, a shock tube, a safety fuse or a detonating cord which is inserted into the open end of the detonator shell.

20. A detonator as claimed in Claim 1 wherein said detonator comprises an electronic detonator.

21. A detonator as claimed in Claim 1 which is essentially free of added primary explosives.

22. A detonator as claimed in Claim 1 comprising a delay element
20 adjacent said igniting device, so as to form a delay detonator.

23. A detonator as claimed in Claim 1 wherein said detonator is impact resistant.

24. A detonator as claimed in Claim 1 wherein said detonator is
25 propagation resistant.

25. An in-hole detonator comprising:

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- (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said shell;
- (iii) optionally a delay element adjacent said igniting device;
- 5 (iv) an initiating element comprising an initiation portion adjacent said delay element or said igniting device, and optionally a transition portion; and
- (v) a base charge,

characterized in that said initiation portion is at least partially contained within a
10 confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

26. A surface detonator comprising:

- 15 (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said shell;
- (iii) optionally a delay element adjacent said igniting device; and
- 20 (iv) an initiating element comprising an initiation portion adjacent said delay element or said igniting device, and optionally a transition portion,

characterized in that said initiation portion is at least partially contained within a
confinement sleeve and comprises an intimate mixture of a relatively large particle
size, porous, powdered explosive having interstitial spaces, and a relatively small
25 particle size, high burn-rate pressurising initiator located within said interstitial spaces.

27. A surface detonator comprising:

- 30 (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said shell;

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- (iii) optionally a delay element adjacent said igniting device; and
- (iv) an initiating element comprising an initiating portion adjacent said delay element or said igniting device,

5 characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces, and wherein said initiation portion achieves only a low order detonation.

10 28. A surface detonator as claimed in Claim 26 or 27 wherein said detonator additionally comprises a base charge, and wherein the shock wave produced by said base charge is reduced by using a diluted base charge or a low density base charge.

15 29. An initiating element for use in a detonator comprising an initiation portion and optionally a transition portion wherein said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

20 30. A process for manufacturing a detonator as claimed in Claim 1 comprising, in order:

- (i) optionally inserting a base charge into a detonator shell;
- (ii) inserting an initiating element comprising an initiation portion and optionally, a transition portion, into said detonator shell;
- (iii) optionally inserting a delay element into said detonator shell;
- 25 and
- (iv) inserting an igniting device into said detonator shell;

wherein all components are operationally adjacent each other, and wherein said initiation portion comprises an intimate mixture of a relatively large particle size, porous powdered explosive having interstitial spaces, and a relatively small

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particle size, high burn-rate pressurising initiator located within said interstitial spaces.

31. A process as claimed in Claim 30 additionally comprising the step of
5 granulating the initiation portion.

32. A process as claimed in Claim 31 wherein said initiation portion is combined with a granulating agent prior to granulation.

33. A method of blasting comprising initiation of an explosive charge utilising at least one detonator, wherein the at least one detonator is as claimed in
10 Claim 1.

34. A composition suitable for use in an explosive detonator, the composition comprising an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size high burn rate pressurising initiator located within said interstitial
15 spaces.